

REMARKS

This Amendment and Response is submitted in reply to the Office Action dated August 25, 2009. With this Amendment, claims 1, 3, 15-19, 20, 25 and 26 have been amended and claim 2 has been canceled. In light of the following remarks, pending claims 1, 3-28 should be allowed. Reconsideration and notice to that effect are respectfully requested.

Examiner Interview

Applicants thank Examiner Chervinsky for discussing the current Office Action and claims with the undersigned. As requested by the Examiner, Applicants are clarifying that the current set of claims are the claims as amended under PCT Article 34 listed above. A Preliminary Amendment and copy of the Article 34 Amendments were submitted on July 5, 2008 at the time the application was filed. As stated in the Remarks section of the Preliminary Amendment "Applicant respectfully requests examination of pending claims 1-28 as amended under PCT Article 34." Also as requested by the Examiner, Applicants are responding to the Office Action based on the current claims.

Claim Cancellation

With this Amendment, claim 2 is canceled without prejudice. In light of the cancellation, the rejection of claim 2 should be withdrawn.

Claim Objections

In the Office Action, claims 17 and 18 were objected to for the following informalities: the preamble of the claims must be the same as the independent claim 15. Claims 17 and 18 have been amended to have the same preamble as independent claim 15. In light of the amendments, the objections to claims 17 and 18 should be withdrawn and claims 17 and 18 allowed.

Claim Amendments

Claims 1 and 3 have been amended to replace the trademark KOVAR® with the chemical composition of nickel-iron cobalt. KOVAR® is a known nickel-cobalt ferrous alloy.

No new matter has been added.

Claims 15, 16, 19 and 26 have been amended to correct typographical errors and to further clarify terms within the claims. No new matter has been added.

Claims 17 and 18 have been amended to further narrow the limitations of claim 15.

Rejections under 35 U.S.C. §102

In the Office Action, claims 1, 2, 4, 5, 6, 7, 10, 11, 15-18, 20-22, 24, and 25-27 were rejected under 35 U.S.C. § 102(b) as being anticipated by McCormick et al. (US 5,909,057). Claims 1, 15, 20 and 25 have been amended such that they all recite a heater spreader construction or an integrated circuitry including a base portion made of a material selected from the group consisting of copper, copper alloys, aluminum, aluminum alloys, composite carbon-carbon materials, silicon carbide, carbon, graphite, diamond, diamond composite materials, and combinations thereof. As stated in the specification, “Exemplary materials which can be utilized for base portion 20 include but are not limited to copper, copper alloys (e.g., Cu-Ni), aluminum, aluminum alloys, composite carbon-carbon materials, SiC, carbon, graphite, diamond and diamond composites (i.e. diamond composites comprising SiC, graphite or carbon), and combinations thereof.” (Page 2, para. 28 of the published application).

Claims 1, 15, 20 and 25 have also been amended such that they all recite a heater spreader construction or an integrated circuitry including a frame portion made of a material selected from the group consisting of copper, copper alloys, aluminum, aluminum alloys, composite carbon materials, diamond, diamond composites, ceramic materials, molybdenum, tungsten, nickel-cobalt iron, nickel-iron (alloy 42 is a known nickel-iron alloy), silicon carbide, carbon, graphite, heat-stable polymer materials and combinations thereof. As stated in the specification, “Exemplary materials which can be utilized for frame portion 30 can be, for example, copper, copper alloys, carbon composite, aluminum, aluminum alloys, diamond, ceramic, molybdenum, tungsten KOVAR® (Westinghouse Electric and Manufacturing Company, Pittsburgh Pa.), alloy 42, SiC, carbon, graphite, diamond composites (see above, for example), and combinations thereof. Alternatively or in addition to these materials, frame portion 30 can comprise an appropriate heat-stable polymer material.” (Page 2, para. 30 of the published application).

Lastly, claims 1, 15, 20 and 25 have been amended to recite that the material of the frame portion is different from the material of the base portion. As stated in the specification, “Base portion 20 and frame portion 30 can be formed of the same material or can have differing compositions relative to one another.” (Page 2, para. 29 of the published application). Using differing materials is possible because the base portion is the primary dissipating region for the heat spreader. Thus, the second portion can be made of a less expensive material, a more easily fabricated material and/or a material with a lower thermal conductivity relative to the base portion. “Accordingly, the cost of materials for the two piece heat spreader in accordance with the invention can be significantly less than conventional single piece heat spreader configurations.” (Page 2, para. 29 of the published application).

McCormick et al. do not teach or suggest each and every limitation of claims 1, 15, 20 and 25. In particular, McCormick et al. do not disclose, suggest or teach a base portion made of one of the above-listed materials. Rather, McCormick only teaches in the “Background of the Invention” section that heat spreaders are typically composed of nickel-plated copper. (Col. 2, lines 65-67). Likewise, McCormick et al. do not disclose, suggest or teach a frame portion made of one of the above-listed materials. Rather, McCormick only teaches in the “Background of the Invention” section that stiffeners are typically composed of nickel-plated copper. (Col. 2, lines 39-41). Furthermore, the material of the heat spreader and the stiffener of McCormick are the same, nickel-plated copper. By contrast, claims 1, 15, 20 and 25 recite a base portion and a frame portion made of a select group of materials. Claims 1, 15, 20 and 25 also recite that the materials of the base portion and the frame portion are different.

The foregoing clearly demonstrates that the claimed heat spreader construction and integrated circuitry are not disclosed, taught, suggested by or inherent in McCormick et al. because the heat spreader and stiffener disclosed in McCormick et al. are composed of nickel-plated copper and because McCormick et al. do not otherwise disclose, teach or suggest other materials for the heat spreaders or stiffeners. Therefore, the rejections of claims 1, 15, 20 and 25 should therefore be withdrawn and claims 1, 15, 20 and 25 allowed. In that claims 1, 15, 20 and 25 are in condition for allowance, the rejections of claims 2, 4-7, 10, 11, 16-18, 21, 22, 25, 26 and 27, which depend therefrom, should be withdrawn and claims 2, 4-7, 10, 11, 16-18, 21, 22, 25, 26 and 27 allowed.

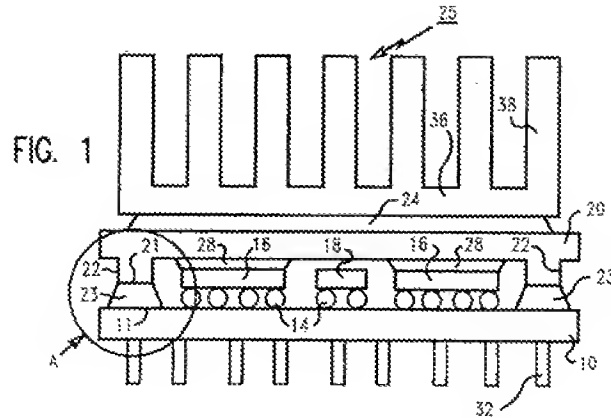
Rejections under 35 U.S.C. §103

In the Office Action, claims 3, 4, 5, 12-14, 19, 23 and 28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over McCormick et al. (US 5,909,057) in view of Edwards et al. (US 5,881,945). The Examiner asserts that McCormick et al. teach all the limitations of claim 3 except the metallic coating. The Examiner attempts to meet this limitation by relying on Edwards et al.

Claim 3 has been amended to recite a heater spreader construction including a base portion made of a first material selected from the group consisting of copper, copper alloys, aluminum, aluminum alloys, composite carbon-carbon materials, SiC, carbon, graphite, diamond, diamond composite materials, and combinations thereof and a frame portion made of a second material selected from the group consisting of copper, copper alloys, aluminum, aluminum alloys, composite carbon materials, diamond, diamond composites, ceramic materials, molybdenum, tungsten, nickel-cobalt iron, nickel-iron (alloy 42 is a known nickel-iron alloy), silicon carbide, carbon, graphite, heat-stable polymer materials and combinations thereof. Claim 3 has also been amended to recite that the second material is different from the first material.

McCormick et al. and Edwards et al. do not individually or in combination disclose, suggest or teach a heat spreader construction including a base portion and frame portion made of one of the above-listed materials, where the base portion and frame portion are made of different materials. As discussed above, McCormick only teaches that stiffeners and heat spreaders are typically composed of nickel-plated copper. (Col. 2, lines 39-41 and 65-67). McCormick et al. do not otherwise disclose, teach or suggest other materials for the heat spreaders or stiffeners.

The Examiner asserts that Edwards et al. teach a metallic coating over at least a portion of a heat spreading surface as recited in claim 3. The Examiner's reliance on the thermally conductive material 28 of Edwards et al. as being positioned over a heat spreading surface is misplaced. Edwards et al. teach a multi-layer metallic seal including a three layer, solder sandwich structure. (Abstract). The thermally conductive material 28 is not positioned over at least a portion of the heat spreading portion as asserted by the Examiner. (Office Action, Page 3, para. 5). Rather, the thermally conductive material 28 is spaced from the heat sink 36 by at least a cap or cover 20 and adhesive layer 24. FIG. 1 of Edwards et al. is reproduced below for reference.



The heat sink is “secured to the cover 20, such as, by using adhesive 24.” (Col. 5, lines 44-46). The thermally conductive material 28 is “placed between the chip 16, and the cap 20, to provide an efficient heat transfer path via the heat sink adhesive 24, to the (optional) heat removing device 36.” (Col. 5, lines 51-54).

The foregoing clearly demonstrates that the claimed heat spreader construction is not individually or in combination disclosed, taught or suggested by McCormick et al. and Edwards et al.. The rejection of claim 3 should therefore be withdrawn and claim 3 allowed.

In that independent claims 1, 15, 20 and 25 are in condition for allowance, the rejections of claims 4, 5, 12-14, 19, 23 and 28, which depend therefrom, should be withdrawn and claims 4, 5, 12-14, 19, 23 and 28 allowed.

Claims 8, 9 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over McCormick et al. In that independent claim 1 is in condition for allowance, the rejections of claims 8, 9 and 11, which depend therefrom, should be withdrawn and claims 8, 9 and 11 allowed.

Conclusion

In summary, pending claims 1-17 and 19-28 are believed to be patentable for at least the reasons described above. Reconsideration and notice to that effect are respectfully requested. If there are any remaining questions, the Examiner is requested to contact the undersigned at the number listed below.

Respectfully submitted,

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